

Claims:

1. A computer implemented method for conducting an auction of a plurality of items wherein at least one computer receives bids and determines an allocation of at least one of the items, the auction including a dynamic auction phase followed by a later phase, the later phase comprising a package auction, the method comprising:

- d) implementing the dynamic auction phase on a computer, said dynamic auction phase comprising:
 - a1) receiving bids from at least one bidder, said bids including at least an indicator of at least one of the items;
 - a2) determining whether the dynamic auction phase of the auction should continue, based on received bids;
 - a3) outputting auction information; and
 - a4) repeating a1) – a3) if the dynamic auction phase of the auction is determined to continue;
- e) changing from the dynamic auction phase to the later phase, following a determination not to continue the dynamic auction phase; and
- f) implementing the later phase of the auction on a computer, the later phase comprising a package auction, said later phase comprising:
 - c3) receiving bids from at least one bidder, said bids including at least an indicator of a package of items and an associated price for the package; and
 - c4) determining an allocation of at least one of the items to one of the bidders based on received bids.

2. A method as recited in claim 1 wherein each bid received in step a1) is a package bid including at least an indicator of a package of items and an associated price for the package.

3. A method as recited in claim 2 wherein bids are constrained by an activity rule in the dynamic auction phase.
4. A method as recited in claim 3 wherein bids are constrained by a revealed-preference activity rule in the dynamic auction phase.
5. A method as recited in claim 1 wherein said step a1) includes transmitting a price vector to bidders prior to receiving said bids.
6. A method as recited in claim 5 wherein bids are constrained by an activity rule in the dynamic auction phase.
7. A method as recited in claim 6 wherein bids are constrained by a revealed-preference activity rule in the dynamic auction phase.
8. A method as recited in claim 2 wherein the determining in the dynamic auction phase is based on solving a winner determination problem.
9. A method as recited in claim 5 wherein the determining in the dynamic auction phase is based on comparing a sum of quantity vectors with an available quantity.
10. A method as recited in claim 2 wherein the receiving in the dynamic auction phase includes the receiving of intra-round bids.
11. A method as recited in claim 5 wherein the receiving in the dynamic auction phase includes the receiving of intra-round bids.
12. A method as recited in claim 1 wherein the later phase comprises a sealed bid package auction.
13. A method as recited in claim 12 wherein the determining in the later phase further includes determining a payment for each winning bidder.
14. A method as recited in claim 13 wherein the determined allocation of items and payments is a core outcome relative to the received bids in the later phase.

15. A method as recited in claim 13 wherein the determined allocation of items and payments is a core outcome relative to the received bids in the dynamic auction phase and the later phase.
16. A method as recited in claim 13 wherein the determined allocation of items and payments is a bidder-optimal core outcome relative to the received bids in the later phase.
17. A method as recited in claim 13 wherein the determined allocation of items and payments is a bidder-optimal core outcome relative to the received bids in the dynamic auction phase and the later phase.
18. A method as recited in claim 12 wherein bids in the later phase are constrained by an activity rule.
19. A method as recited in claim 12 wherein bids in the later phase are constrained by a relaxed revealed-preference activity rule.
20. A method as recited in claim 1 wherein the later phase comprises a dynamic package auction.
21. A method as recited in claim 20 wherein the determining in the later phase further includes determining a payment for each winning bidder.
22. A method as recited in claim 21 wherein the determined allocation of items and payments is a core outcome relative to the received bids in the later phase.
23. A method as recited in claim 21 wherein the determined allocation of items and payments is a core outcome relative to the received bids in the dynamic auction phase and the later phase.
24. A method as recited in claim 21 wherein the determined allocation of items and payments is a bidder-optimal core outcome relative to the received bids in the later phase.
25. A method as recited in claim 21 wherein the determined allocation of items and payments is a bidder-optimal core outcome relative to the received bids in the dynamic auction phase and the later phase.

26. A method as recited in claim 20 wherein bids in the later phase are constrained by an activity rule.
27. A method as recited in claim 20 wherein bids in the later phase are constrained by a relaxed revealed-preference activity rule.
28. A method as recited in claim 12 wherein the later phase comprises a proxy auction.
29. A method as recited in claim 28 wherein bids in the later phase are constrained by an activity rule.
30. A method as recited in claim 28 wherein bids in the later phase are constrained by a relaxed revealed-preference activity rule.
31. A method as recited in claim 20 wherein the later phase comprises a proxy auction.
32. A method as recited in claim 31 wherein bids in the later phase are constrained by an activity rule.
33. A method as recited in claim 31 wherein bids in the later phase are constrained by a relaxed revealed-preference activity rule.
34. A method as recited in claim 12 wherein the determining in the later phase is based on solving a winner determination problem.
35. A method as recited in claim 20 wherein the determining in the later phase is based on solving a winner determination problem.
36. A method as recited in claim 28 wherein the determining in the later phase is based on solving a winner determination problem.
37. A method as recited in claim 31 wherein the determining in the later phase is based on solving a winner determination problem.
38. A computer implemented system for conducting an auction of a plurality of items wherein at least one computer receives bids and determines an allocation of at least one of the

items, the auction including a dynamic auction phase followed by a later phase, the later phase comprising a package auction, the system comprising:

- a) means for implementing the dynamic auction phase on a computer, said means for implementing the dynamic auction phase comprising:
 - a1) means for receiving bids from at least one bidder, said bids including at least an indicator of at least one of the items;
 - a2) means for determining whether the dynamic auction phase of the auction should continue, based on received bids;
 - a3) means for outputting auction information; and
 - a4) means for repeating a1) – a3) if the dynamic auction phase of the auction is determined to continue;
- b) means for changing from the dynamic auction phase to the later phase, following a determination not to continue the dynamic auction phase; and
- c) means for implementing the later phase of the auction on a computer, the later phase comprising a package auction, said means for implementing said later phase comprising:
 - c1) means for receiving bids from at least one bidder, said bids including at least an indicator of a package of items and an associated price for the package; and
 - c2) means for determining an allocation of at least one of the items to one of the bidders based on received bids.

39. A system as recited in claim 38 wherein the means for receiving bids of a1) receives a package bid including at least an indicator of a package of items and an associated price for the package.

40. A system as recited in claim 39 wherein the means for receiving bids includes means to constrain said bids by an activity rule.

41. A system as recited in claim 40 wherein the means for receiving bids includes means to constrain bids by a revealed-preference activity rule.
42. A system as recited in claim 38 which further includes means for transmitting a price vector to bidders and means for enabling the means for receiving bids to receive said bids only after said price vector has been transmitted.
43. A system as recited in claim 42 which includes means to constrain bids by an activity rule in the dynamic auction phase.
44. A system as recited in claim 43 wherein the means to constrain bids constrains the bids by a revealed-preference activity rule.
45. A system as recited in claim 39 wherein the means for determining of a2) solves a winner determination problem.
46. A system as recited in claim 42 wherein the means for determining of a2) compares a sum of quantity vectors with an available quantity.
47. A system as recited in claim 39 wherein the means for receiving bids of a1) receives at least intra-round bids.
48. A system as recited in claim 42 wherein the means for receiving bids of a1) receives at least intra-round bids.
49. A system as recited in claim 38 wherein means for implementing the later phase comprises means for implementing a sealed bid package auction.
50. A system as recited in claim 49 wherein the means for determining of c2) further includes means determining a payment for each winning bidder.
51. A system as recited in claim 50 wherein the means for determining produces a core outcome relative to the received bids of c1).
52. A system as recited in claim 50 wherein the means for determining produces a core outcome relative to the received bids of a1) and c1).

53. A system as recited in claim 50 wherein the means for determining produces a bidder-optimal core outcome relative to the received bids of c1).
54. A system as recited in claim 50 wherein the means for determining produces a bidder-optimal core outcome relative to the received bids of a1) and c1).
55. A system as recited in claim 49 which includes means to constrain bids received by the means for receiving of c1) by an activity rule.
56. A system as recited in claim 49 which includes means to constrain bids received by the means for receiving of c1) by a relaxed revealed-preference activity rule.
57. A system as recited in claim 38 wherein the means for implementing the later phase implements a dynamic package auction.
58. A system as recited in claim 57 wherein the means for determining in the later phase further includes means for determining a payment for each winning bidder.
59. A system as recited in claim 58 wherein the means for determining an allocation of items and payments determines a core outcome relative to the received bids in the later phase.
60. A system as recited in claim 58 wherein the means for determining an allocation of items and payments determines a core outcome relative to the received bids in the dynamic auction phase and the later phase.
61. A system as recited in claim 58 wherein the means for determining an allocation of items and payments determines a bidder-optimal core outcome relative to the received bids in the later phase.
62. A system as recited in claim 58 wherein the means for determining an allocation of items and payments determines a bidder-optimal core outcome relative to the received bids in the dynamic auction phase and the later phase.
63. A system as recited in claim 57 which further includes means for constraining bids in the later phase by an activity rule.

64. A system as recited in claim 57 which further includes means for constraining bids in the later phase by a relaxed revealed-preference activity rule.
65. A system as recited in claim 49 wherein the means for implementing the later phase implements a proxy auction.
66. A system as recited in claim 65 which further includes means for constraining bids in the later phase by an activity rule.
67. A system as recited in claim 65 which further includes means for constraining bids in the later phase by a relaxed revealed-preference activity rule.
68. A system as recited in claim 57 wherein the dynamic package auction implemented by the means for implementing the later phase comprises a proxy auction.
69. A system as recited in claim 68 which further includes means for constraining bids in the later phase by an activity rule.
70. A system as recited in claim 68 which further includes means for constraining bids in the later phase by a relaxed revealed-preference activity rule.
71. A system as recited in claim 49 wherein the means for determining of c2) solves a winner determination problem.
72. A system as recited in claim 57 wherein the means for determining of c2) solves a winner determination problem.
73. A system as recited in claim 65 wherein the means for determining of c2) solves a winner determination problem.
74. A system as recited in claim 68 wherein the means for determining of c2) solves a winner determination problem.